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HEATING, COOKING & HOT WATER SUPPLIES FOR THE POST WAR HOUSE

CA/56

SUMMARY OF VIEWS OF THE WOMEN'S ADVISORY COMMITTEE ON SOLID FUEL

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HEATING, COOKING AND HOT WATER SUPPLIES FOR THE POST-WAR HOUSE

A summary of the views of the

WOMEN'S ADVISORY COMMITTEE

ON SOLID FUEL

1/3

MARCH 1944

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I Introduction

1 Our Committee was formed in March, 1943,* following a request made by the Domestic Fuels and Appliances Committee of the coal industry to some of the leading women's organisations for advice as to the features regarded as important from the women's standpoint, in providing heating, cooking and hot water supply service in post-war building. We have had the benefit of meeting many leading experts on the subject; our members have personally visited collieries, carbonisation works, and factories where appliances are manufactured. We have also drawn on the many valuable reports recently issued by official and unofficial committees which have investigated problems of housing and post-war reconstruction generally. A list of the principal documents and sources of information used in preparing this Report is given in Appendix II.

2 The Domestic Fuels and Appliances Committee, the British Coal Utilisation Research Association and some of the appliance manufacturers have afforded us access to research and development work now in progress. This has helped us to form our own conclusions as to the improvements in domestic heating and cooking services which we are entitled to expect after the war.

3 At the same time we desire to make it clear that the views and recommendations put forward in this Report are our own, and do not necessarily represent those of the coal industry or other bodies with which we have been in touch.

4 We regard it as our function to provide a link between the housewife on the one hand and research workers and technicians on the other. Our task has been, and will continue to be, that of presenting the needs of women in such a way that they may help to guide the course of research and of expressing the results of such research in language which can be readily understood by the untrained users of fuel.

5 We realise that the demand for new houses must exceed supply for many years to come. We are anxious that everything possible should be done to avoid the danger of undue haste in building, which may lead to neglect of the essential services of heating, cooking and hot water supply.

6 The disastrous policy, followed after the last war, of cutting down building costs led in many cases to inferior and inconvenient installations and an increased burden upon the weekly budget of the householder. We believe that an extensive use of temporary dwellings would be preferable to the policy of building, with inadequate preparation, permanent houses which will adversely affect living conditions for many years. We would suggest, however, that temporary buildings should be used only under public control and with a statutory limitation to their period of habitation.

* See Appendix I.

II Views on Future Developments

7 Heating services cannot be adequately studied without taking into account the whole housing question, and this in turn forms a part only of the problem of national reconstruction. In considering this problem we have studied not only the reports of the Scott, Barlow and Uthwatt Committees but also corresponding reports made by the National Resources Committee of the U.S.A.* Since domestic services are thus an inseparable part of the whole problem of post-war planning we have thought it advisable to express our views on post-war issues wherever these affect the particular question which we have had to consider.

8 We would summarise the general conclusions that we have reached from our studies as follows:—

(*a*) There is a general demand for a positive policy in dealing with the official reports mentioned above, as well as with private reports such as our own.

(*b*) Authorities responsible for housing and reconstruction generally should take account of the changing attitude of women towards household drudgery.

(*c*) There is a need to foster in all branches of industry a new attitude towards national duty.

(*d*) Notwithstanding the desire of women for improved household amenities, there is widespread ignorance of what is possible. Unless this is removed there may be resistance to change, even for the better.

(*e*) The education of the public in the better use of fuel, which has been undertaken as a wartime measure, should be continued and extended after the war. Housing managers and other interested persons should receive some training in the proper use of appliances.

(*f*) In the interests of coal conservation and national economy, competition between the fuel and power industries should be replaced by planned co-operation, provided such collaboration is also in the interests of the consumer.

9 We attach the greatest possible importance to smoke abatement and the reduction of atmospheric pollution, due to the wrong use of raw coal. What we have seen of low- and high-temperature carbonisation plants leads us to hope that smokeless fuels produced by these means will become available in greater quantities in the future. We appreciate, however, that it will be many years before the possibility of abolishing the use of raw coal can be seriously considered.

10 On account of its cheapness, and the fact that it can be stored to meet sudden demands for heat during the winter cold spells, coal has advantages which cannot be ignored.

* See Appendix III.

For these reasons it is of paramount importance that every effort should be made to provide more convenient and efficient coal-using appliances, and to ensure that such appliances are of the latest types and capable of reducing smoke.

III A Long-Term Policy

(a) Problems to be Solved

11 It is important to plan better conditions of living on a national scale. This means that the good of the people as a whole must come before the interest of individual industrialists, and that the efficiencies of all heating services must be greatly increased.

12 A study of population trends* is required for judging not only how many houses will be needed but also the kind of house that will be in demand for families of different incomes and different sizes, living in different parts of the country.

13 Clean air is essential to the health of the people, and coal must be burned in such a way as to eliminate the pollution of the atmosphere by smoke.

14 The question of recreation is important if people are to lead balanced lives. At present the burden of housework is often excessive. An increased supply of domestic workers† will not solve this problem unless efficient labour-saving equipment is provided. We feel that municipal meals and laundry services may well be in demand after the war, and local authorities should provide these in a more systematic way than has been possible in the past.

(b) Heating Services for Urban and Rural Conditions

15 We attach importance to making each household free to choose the method of heating, cooking and hot water supply that best suits the family requirements. This is perhaps an ideal for the future, and will generally only be feasible in immediate post-war housing in large urban centres. In rural and in certain urban districts only one, or at the most two, of the services (electricity, gas, solid fuel) may be available. We hope that it may be possible to extend the use of systems of district‡ heating as well as of central heating, which have the advantage of ensuring an abundant hot water supply for all purposes.

16 We consider that all the smokeless solid fuels produced should be reserved for use in town dwellings, and the town housewife must be educated in their use.

* See Appendix IV. † See Appendix V. ‡ See Appendix VI.

17 Gas supplies are still difficult to obtain in country districts, but we are given to understand that the gas industry intends to extend its facilities after the war. The supply of electricity is important as it is universally wanted for lighting and for services, such as the radio, which have come to be regarded almost as necessities.

18 Solid fuel is especially suitable for rural households. It is very important that some appliances should be designed to enable wood and, in some cases, peat, to be used as a fuel, as well as coal. We would also emphasise that many of the appliances which were installed in rural cottages before the war were most unsatisfactory. It is essential that the most efficient equipment should be provided as soon as possible as part of the general policy of raising the standard of living of the agricultural worker.

19 We have carefully considered the influence of approved appliances* on the grounds of possible reductions of the labour and attention required in tending them, and of the weekly fuel bill. From both aspects we find an unanswerable case for installing good equipment, even at a higher initial cost. We consider suggestions as to the apportionment between local and national contributions to be outside the scope of this Report, but we feel that, in the interests of families of the lowest income levels, special subsidies should be given to ensure that no inferior equipment will be installed in any house.

IV A Short-Term Policy for the Immediate Post-War Years

(a) The Need for Correlation with Long-Term Planning

20 No short-term measures of a haphazard nature should be permitted, even immediately after the war. We must begin as we mean to go on, and provide householders with the best possible heating services from the start. This means that production must be planned now, so that industry will not need to fall back on pre-war designs in order to save time in supplying new equipment after the war.

21 The mistakes of the past often sprang from ignorance, on the part of housing authorities and private builders, of the real needs of the housewife. If, as we hope, women intend to take a more active part in national and municipal government in the future, we may look to them to watch over these matters. It would be a move in the right direction if more women were appointed to housing committees, and to executive posts in connection with housing.

* See Appendix XI.

22 The latest advances in the pre-fabrication* of houses, provided the work is of sufficiently high standard, should be used to the full to hasten production after the war.

23 The provision of good heating services may increase the cost of housing in the immediate post-war years.† We would point out, however, that this tendency will be offset by the reduction in running costs. We see no reason why the increased cost should be permanent, if research and technical developments are pressed forward with vigour.

(b) Equipment of Houses

(i) *General Considerations*

24 Our special concern is to deal with the needs of the woman who is living on the lowest income level and is without help in the house.‡ It should not be difficult to provide good heating services where there is money to be spent, but both local authorities and private builders require guidance in the provision of appliances that will enable the poorest householders to get really good cooking and hot water facilities, as well as room heating, at a low cost.

25 The ultimate ideal is to provide background warmth to every inhabited building. Such warmth may be augmented by radiant heat when and where it can be provided for extra comfort, but we consider that in future all houses should be heated throughout. Only a low temperature is required—merely sufficient to keep the house dry and comfortable.

26 Convected warm-air systems may prove particularly suitable for small houses; we believe they are widely used in Canada and the U.S.A.

27 Labour-saving is as important as economy, and may help the housewife to work more efficiently. In Appendix X (Table II) we show how labour-saving can, in many cases, be equivalent to a cash saving.

(ii) *The Small House*

28 Small houses do not necessarily require central heating, as they can be warmed effectively by one continuously burning fire. A list of suitable types of such fires is included in Appendix XI, and it should be noted that many of them both heat water and supply heated air to a second room.

29 In "non-parlour" houses one appliance for heating, cooking and hot water may sometimes be practicable if there are no children; but in urban districts, where gas and electricity are readily available, and are preferred for cooking, these are

* See Appendix VII. † See Appendix VIII. ‡ See Appendix IX.

probably more convenient. There is scope for further development of really efficient back-to-back grates, to minimise labour in non-parlour houses. A cooker and water heater which is self-setting (i.e. stands free of the wall and is not built in), installed in a small working kitchen, with a separate modern fire in the living room, is an ideal solution; but this may involve extra cost, both for installation and for running.

30 We recommend, if the housewife prefers it, the provision of ''parlour'' houses for families with more than one child. Where the housewife who has a parlour house wishes to keep a ''best'' room, similar arrangements to those for the non-parlour house must be made. If, on the other hand, the parlour is in general use a good combination grate of the newest type, installed in the living room, may be preferred.

31 We consider that the old types of scullery and washhouse should be replaced in all houses by a ''utility'' room, complete with laundry equipment, which must include good drying and airing cupboards. These should be efficiently ventilated.

32 We should also like to recommend that wherever possible a coal fire be provided in at least one bedroom for use in case of illness. It is, however, necessary to consider the additional work this places upon the housewife at a time when she will already be overburdened. We have therefore noted with particular interest the new development of heating bedrooms with convected warm air drawn from the main living-room fire. We feel that this is a method which should receive serious consideration. Gas or electric points should also be provided wherever possible.

33 The use of solid fuel is recommended for country districts. For this purpose adequate storage accommodation is required, to avoid the need for frequent deliveries. We have particularly noted the advantage of continuously burning cookers, which can be used for the preparation of preserves and other foods requiring slow cooking.

34 Some alternative to solid fuel for cooking and water heating in hot weather should be provided, especially in southern areas. Gas water heaters or electric immersion heaters should be installed by the local authority or the builder; it should not be left to the householder to purchase these appliances. Points for portable heaters for intermittent use between seasons and for other gas or electrical appliances should be provided in all rooms.

(iii) *Homes for the Aged and People Living Alone*

35 Old people should be supplied with one of the new continuously burning, smoke-reducing fires with weekly ash removal. Multiple-duty appliances of this type are now being further developed and should recommend themselves to old people on account of the economy in running costs effected by providing several services (space heating, cooking, and water heating) from a single grate.

36 Houses for younger people living alone are an obvious field for the use of gas and electricity, although here too the continuously burning three-service unit may be

very welcome. There is a far greater incentive to spend evenings and to cook meals at home if the living room is found warm and well aired on returning from work. Immediate availability for use in the early morning is another important advantage of the continuously burning unit.

(iv) *Flats*

37 Collective central heating and hot water supply can most easily be provided in flats from a central, automatically stoked boiler in each block. Where the use of solid fuels is desired in individual flats the question of delivery and storage calls for special care on the part of planners.

(c) Specific Appliances

38 Only general recommendations on the subject of appliances can be put forward in this Report. Builders of new houses can make their own choice from the types mentioned in Appendix XI.

39 We consider it a fundamental necessity that all appliances offered for installation in new or reconditioned houses should first be tested by an independent body, and certified to reach the standards of performance laid down by an appropriate authority.

40 We attach great importance to the elimination from the market of faulty and badly designed appliances. This is possible only if the makers are prepared to submit voluntarily to a general system of testing and certification, or if the Government—or the coal industry—insists upon their doing so. While, of course, individual appliances cannot be tested separately owing to the heavy cost, any type sanctioned by housing authorities, for purchase and installation in either new or reconditioned houses, should be subjected to stringent tests for performance, workmanship and general suitability. We understand that a Committee is preparing standards of performance of solid-fuel appliances, and we hope that these will be set as high as is feasible in the light of present-day technical knowledge and experience, and will be adopted as British Standards for general use.

41 One of the reasons for the presence of out-of-date solid-fuel appliances in present-day houses is the fact that they are usually built in. Not only are they difficult to renew, but they are landlord's fixtures. We strongly recommend that the self-setting type of solid-fuel appliance (see para. 29), especially for cooking, should in future be used in all houses. In the case of houses for sale, such appliances could be exchanged to suit the owner's preference. This does not, however, meet the case of the subsidy house, with which this Report is chiefly concerned. Nevertheless, we believe that a self-setting appliance would be more readily renewed when it became obsolete than are present-day built-in ranges and fires.

(d) Storage and Distribution of Solid Fuels

42 The whole question of fuel stores for houses and flats requires thorough study, and we hope to make this the subject of a further report. For the time being it is sufficient to state that there is no excuse for perpetuating the present inadequate storage arrangements. It should be possible to provide good, covered stores for all dwellings. These should give easy access, both for delivery and for filling scuttles, and be compartmented to take at least 2 months' supply of two kinds of fuel in towns, and 3 months' in rural areas.

43 Central stores are recommended for blocks of flats, and may possibly be introduced for groups of houses. We are at present studying the many problems involved in organising these methods of supply.

44 Improved distribution services are essential. The present system of small deliveries is uneconomic from the point of view of the nation, as well as from that of the distributor and consumer. Where fuel is bought at the door, it is impossible to ensure that the right types are obtained for the appliances in use. More general encouragement to pay by instalments would help the poorer housewives to lay in good stocks.

45 We fully recognise that the higher standards of convenience and efficiency that we call for in the use of fuels will require appliances that need adjustment and regulation. For example, continuously burning fires, which are so important from the point of view of reduction of labour, have to be set at very low burning rates at night in order to avoid waste. Similarly, the type of cooking appliance which will provide several services from a single fire can give the best results only if its use is properly understood. Children should be taught, even in elementary schools, the basic facts about our national coal resources and the necessity for conserving them.* Domestic science teachers should study and seek to understand the functions of the improved appliances; and schoolchildren, both boys and girls, should be taught how to use them. For the adults, who have not had previous experience of the use of such appliances, it will be necessary to provide demonstrators in the same way as has been done in the past in connection with gas and electricity. All these are matters which will require attention, both by the education authorities and by the solid-fuel interests.

46 In the interest of brevity we have refrained from setting out in detail all the reasons which have led us to the recommendations made in this Report. Some of these are given in the Appendices, together with information which we regard as important from the point of view of assessing probable future trends in the development of domestic appliances and fuels.

* See Appendix XII.

V Summary of Recommendations

47 Although we realise the need for proper heating services for houses everywhere, in this Report we have laid special stress on the requirements of the lower income ranges. Bearing this in mind, our principal recommendations may be summarised as follows:—

(1) Domestic heating and power services should be studied against the background of national requirements as a whole (paras. 7 to 14).

(2) Active steps should be taken to minimise pollution of the atmosphere by smoke (paras. 9 and 13).

(3) Labour-saving features should be introduced as far as possible into post-war equipment (para. 14).

(4) A long-term policy for domestic heat services should be planned without delay (paras. 11 to 19).

(5) The urgent necessity of building houses immediately after the war should not obscure the need for efficient equipment, and from this point of view a short-term policy is needed (paras. 20 to 23).

(6) Local authorities and private builders should be given advice on how to provide services at the lowest running costs for their poorest tenants (para. 24).

(7) One continuously burning fire, with weekly ash removal, can provide all the principal services required for a small house (para. 28).

(8) The efficient back-to-back grate may prove the cheapest method of supplying cooking and heating and hot water services (para. 29).

(9) The preferable solution, where finances permit, is a self-setting cooker in a small working kitchen, with a separate fire in the living room (para. 29).

(10) Parlour houses should be provided for families with more than one child (para. 30).

(11) The old type of scullery and washhouse should be replaced in all houses by a ''utility'' room, complete with laundry equipment and drying cupboard (para. 31).

(12) Background warming of at least one bedroom by convected air may possibly provide a satisfactory alternative to warming by means of a coal fire. Experiments are still being carried out with this process (para. 32).

(13) Solid fuel is recommended for use in country districts, and here the continuously burning cooker has special advantages (para. 33).

(14) Some alternative to solid fuel for cooking and hot water supply in hot weather and for intermittent space-heating between seasons should be provided, especially in southern areas (para. 34).

(15) For older people all services can be provided from a single fire, which should be of the continuously burning type (para. 35).

(16) Continuously burning units may be of special value for younger people living alone, on account of availability for service, both in the early morning and on returning from work (para. 36).

(17) Further schemes for district heating and central heating should be tried out experimentally (paras. 15 and 37), and every effort should be made to secure background warmth in all houses (para. 25).

(18) Ineffective appliances should be eliminated from the domestic market and, with this end in view, testing and certification of appliances should be made compulsory (paras. 39 and 40).

(19) Built-in appliances should be replaced by self-setting equipment, which the householder should be at liberty to exchange to suit individual preferences (para. 41).

(20) All houses should be provided with adequate facilities for storing solid fuel. Arrangements for the distribution of solid fuel should be improved and payment by instalments made generally available for the benefit of poorer housewives (paras. 42 to 44).

(21) Education in coal conservation, both for schoolchildren and for adults, is imperative if improved appliances are to be utilised to the best advantage (para. 45).

APPENDICES

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APPENDIX I

CONSTITUTION OF WOMEN'S ADVISORY COMMITTEE ON SOLID FUEL

Chairman	The Hon. Lady Egerton
Vice-Chairman	Miss Blanche Randle (National Council of Women of Great Britain)
Organising Secretary	The Hon. Mrs. E. C. Rollo

ORGANISATIONS REPRESENTED

Association of Teachers of Domestic Subjects	Miss Ethel Willans, M.B.E.
British Federation of Business and Professional Women (Individual Members Group)	Miss G. Hindes, M.Sc., M.P.S.
British Legion, Women's Section	Councillor Mrs. Elsie Chamberlain, J.P.
Domestic Fuels and Appliances Committee (Liaison Member)	Miss Rina Hands, B.A.
Federation of Soroptimists' Clubs of Great Britain and Ireland	Mrs. M. McLaughlan
Good Housekeeping Institute	Miss P. L. Garbutt, A.R.I.C.

Institute of Fuel	Miss J. Pope
National Federation of Women's Institutes (Liaison Member)	Mrs. M. K. Oldham
National Union of Domestic Workers	Miss Nancy Adam
Public Service Section, Forum Club	Mrs. E. Edmonds
Solid Fuel Installations Committee (Liaison Member)	Mrs. I. T. Barclay, B.A., F.S.I. (Deputy: Mrs. Denham Barclay)
The Housing Centre	Miss A. M. Lupton, M.B.E.
Town and Country Planning Association	Mrs. E. McAllister, M.A.
Women's Advisory Housing Council	Mrs. W. de l'Hôpital, O.B.E., L.L.A.
Women's Co-operative Guild	Mrs. Cecily Cook
Women's Publicity Planning Association	Mrs. Rebecca Sieff

INDIVIDUAL MEMBERS

Designer	Mrs. Darcy Braddell
Member of Oxford City Council Housing Committee	Councillor Mrs. Helen Brown, J.P.
Physicist	Mrs. D. M. Charlton, B.Sc.
Dietetician	Mrs. R. Coit
Lecturer at Imperial College of Science and Technology	Dr. Margaret Fishenden, F.Inst.P. (Hon. Member)
Press agent	Miss E. A. Leach
Housewife	Mrs. V. Maxwell-Lyte
Housewife	Mrs. B. Potter

In July, 1943, the Committee set up an Editing Panel, which undertook to carry out the studies necessary for the preparation of this Report. The Constitution of the Panel, which prepared the Report in draft form for the Committee's approval, is as follows:—

Mrs. I. T. Barclay, B.A., F.S.I.	Society of Women Housing Managers
Mrs. D. M. Charlton, B.Sc.	Physicist
Mrs. Cecily Cook	Women's Co-operative Guild
Miss Rina Hands, B.A.	Domestic Fuels and Appliances Committee
Miss E. A. Leach	Press agent
Mrs. Rebecca Sieff	Women's Publicity Planning Association

Secretary

The Hon. Mrs. E. C. Rollo

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APPENDIX III

EXTRACTS AND CONCLUSIONS FROM REPORTS ON NATIONAL PLANNING

Report on the Royal Commission on the Distribution of the Industrial Population (The Barlow Report)

The Commission unanimously accepted the following conclusions:—

"(1) In view of the nature and urgency of the problems before the Commission, national action is necessary.
(2) For this purpose, a Central Authority, national in scope and character, is required.
(3) The activities of this Authority should be distinct from and should extend beyond those within the powers of any existing Government Department.
(4) The objectives of national action should be:—
(*a*) Continued and further re-development of congested urban areas where necessary.
(*b*) Decentralisation or dispersal, both of industries and industrial population, from such areas.
(*c*) Encouragement of a reasonable balance of industrial development, so far as possible, throughout the various divisions or regions of Great Britain, coupled with appropriate diversification of industry in each division or region throughout the country" (para. 428).

It is obvious that the changes as they are envisaged by the Commission will involve more than the mere repairing of bomb damage. In order not to impede the implementing of the long-term and large-scale plans the local and immediate needs must be integrated as the initial step in the construction of the general framework of national planning.

Report of the Committee on Land Utilisation in Rural Areas (The Scott Report)

This report is extensively quoted here as it deals fully with the provision of heating services for rural areas. It will be seen that extensive improvements in the supplies of gas and electricity to villages are advocated. Whether such improvements will be possible in the immediate post-war period or not, we believe that there will be a wide field for the use of solid fuel in country districts, especially in the North, for many years to come. It is clear, however, that the coal and allied industries must make sure of having ready for immediate post-war use the very best possible types of appliance and the fuels suitable for burning in them.

Two principal points emerge:

"One is the necessity of making plans for the use of land *now* . . . so that they can be put into operation immediately on the cessation of hostilities. . . . The other is the importance of drawing up in a definite period of time, a definite plan which shall be part of the general long-term planning policy" (para. 241).

It is recommended that a definite five-year plan be formulated and that, among other work, a comprehensive investigation of electricity, gas and water supplies be completed within the first year.

"The broad conclusions reached, therefore, as a result of the review of developments of pre-war years and the changes brought about by the war, are that the former trends of constructional development, with perhaps some slight modifications tending to a greater diffusion into country areas, will, unless checked and directed, reassert themselves after the war. A post-war building boom, possibly even more intense than that which took place in the 1920's, if left to take care of itself, will lead to the same, and probably worse evils than those which took place in the inter-war period" (para. 138).

"We consider that the resuscitation of village life and of the countryside will not be achieved by an enforced or artificial dispersal of industry bringing to the country unwilling town dwellers, but by so improving housing and general living conditions and so equalising economic, social and educational opportunities in towns and country, that those who prefer country life will no longer find themselves and their children at a permanent disadvantage" (para. 159).

"The supply of *electricity* is an essential service which in due course should be available in the home of practically every citizen in town and country alike, at no higher price to the consumer in the country than in the town. . . . We were much impressed by the evidence received that a comparable national supply of electricity could be attained by appropriate reorganisation of the distribution side of the industry, and that parity of cost between town and country could be achieved without increasing the burden on the town. . . ."

"We are influenced by the evidence received of the success attending comprehensive schemes for rural supply, it being shown that farms are large consumers of electricity, and that such schemes, especially where gas is not available, have resulted in an actual lowering of charges to urban consumers whose consumption, often for lighting only, is relatively small" (para. 165).

"From evidence submitted it appeared that a large proportion of consumers whilst using electricity for lighting, prefer *gas* for heating and cooking, and it is considered that new houses should be constructed so as to give the tenants the option of using either gas or electricity for cooking and/or heating. The thermal efficiency achieved by the conversion of coal to gas and coke is such that not only should the use of coke stoves and fires be encouraged on that ground alone, but also as promoting a smoke-free atmosphere. Since gas is, according to evidence received, essential for certain industries and its place cannot conveniently be taken by electricity, we consider there should be the closest collaboration between the gas industry and planning officers, especially where the location of a new industrial plant is concerned" (para. 166).

"We consider that the provision of a piped water supply is an essential service in every village and on every farm and a desideratum in every dwelling" (para. 167).

"Whether or not there is to be any considerable influx of industry and industrial population into country areas, there must inevitably be a good deal of new building to replace the old outworn cottages, farm houses and farm buildings, which are now such common features in most districts, as well as much completely new housing. . . . The farm worker and his family have far more chance of a happy social life and better opportunities of developing as self-reliant and responsible members of society if they live in a village. This is true of all dwellers in the countryside. It applies to the week-ending townsman, and to those people who go to live in ribbon

developments as well as to the genuine countrymen. Though not all country dwellers can live in groups, the Committee consider that planning schemes should be so designed as to direct all new settlers into country towns and villages, except where they can advance some decisive reason why they should be housed in the open countryside. Such a direction would not only benefit the settlers themselves, it would go a long way towards putting an end to that sporadic and scattered building which has done so much to spoil and suburbanise, and consequently (as many witnesses have pointed out to us) to affect seriously the agricultural production of large parts of the country during the last two or three decades, particularly those parts within the immediate sphere of influence of the towns. Closer building will also facilitate the provision of services'' (para. 204).

Report of Committee for Compensation and Land Betterment (The Uthwatt Report)

This report deals with the ownership of land. A national land policy is advocated as the basis on which large-scale planning can proceed systematically and unhampered by individuals. The unification of land ownership is rightly considered to be indispensable to the prevention of haphazard use of land for building.

National Resources Committee of the U.S.A.—Technological Trends and National Policy

The following extract dealing with the terms of reference of this report shows the far-reaching influences produced by technological changes and their intimate interplay with social forces.

''Though the influence of invention may be so great as to be immeasurable . . . there is usually opportunity to anticipate its impact upon society since it never comes instantaneously without signals. For invention is a process and there are faint beginnings, development, diffusion and social influences, occurring in sequence, all of which require time. From the early origins of an invention to its social effects the same interval averages about 30 years.''

''. . . The scientific achievement comes first and the social effects later. The fact that there is a lag makes invention a social barometer.''

''An invention usually affects first persons using it directly. If it be a producer's goods such as a farm tractor, it means at once the replacement of horses or mules, the purchasing of gasoline, and the changes in various other farm practices. If it be a consumer's goods such as an air-conditioning unit in a home, it affects the construction and use of the house, but, of course, the units must be fabricated and hence, for the purpose, factories must be created, marketing machinery set up, etc. All such results are called the primary influences of the new technology. . . .''

In general, the first primary effect of an invention is found in (*a*) the economic practices of production and (*b*) the habits of the consumers using the finished product. The report continues:

''The attitude towards the philosophy of *laissez faire* eventually undergoes change as more and more governmental services are demanded, despite profession of the old faith to the contrary. The philosophy regarding home changes too. It is not so clear under the new conditions of the machine age that woman's place is in the home or that the authority of paternalism in the family is exercised as wisely as it was thought to be in the days of our forefathers. Also attitudes towards recreation and leisure time change, with city conditions and repetitive labour in factories.

''Some time elapses before the full effects of an invention are worked out. This time element furnishes an opportunity of studying and forecasting what the social consequences may be.

''Social institutions as well as natural resources are affected by technology, as has been shown. The home was changed because a steam engine and the machines it drove were too

large for a dwelling. Now there has come a new source of power readily available for home use, electricity. Will it restore to family life something of its former glory before steam reduced its functions?''

Conclusions Drawn from the Above Reports

Systematic planning on a nation-wide scale and conceived as a long-term development is essential.

Measures to be undertaken at the time of demobilisation must be prepared now and carried through as the initial stage of the long-term development.

The distribution of population and industry should be such as to encourage a reasonable balance of rural and urban settlements throughout the country.

National, regional and local plans require co-ordination so as to ensure that hitherto ''neglected'' parts of the country will play a more active part in the future. The maximum use of all the national resources is one of the guiding principles in this process.

It is essential that there should be systematic co-ordination and interchangeability of all the public utility services.

Domestic solid-fuel-burning appliances will be able to play a considerable role in these developments if their design is systematically adapted to meet changing needs.

One trend, however, needs special consideration. As post-war reconstruction aims not merely at the repair of damage and neglect which have accrued during the war, but at a higher standard of living, achievements in the social field will be increasingly regarded as the yardstick of the fulfilment of economic needs.

APPENDIX IV

FUTURE POPULATION TRENDS IN THE UNITED KINGDOM

Table I

ESTIMATES OF POPULATION FROM 1935 TO 2035, SUBMITTED BY DR. ENID CHARLES TO THE BARLOW COMMISSION

Year	England and Wales (thousands)			Scotland (thousands)	
1935	(*a*) 40 563	(*b*) 40 563	(*c*) 40 563	(*a*) 4 945	(*b*) 4 945
1945	40 876	40 392	42 338	5 151	5 114
1955	40 207	38 777	43 651	5 299	5 110
1965	38 504	35 799	43 744	5 360	4 935
1975	36 038	31 452	43 021	5 345	4 558
1985	33 106	26 087	41 612	5 270	3 989
1995	30 019	20 440	39 871	5 149	3 309
2005	27 090	15 058	38 177	5 014	2 600
2015	24 467	10 456	36 646	4 890	1 935
2025	22 121	6 940	35 104	4 770	1 369
2035	19 969	4 426	33 585	4 647	925

Estimate (*a*) assumes a continuance of the fertility and mortality of 1933.

Estimate (*b*) assumes that both fertility and mortality continue to fall at a rate deduced from

recent trends. It postulates constant fertility for women under 20 years of age, a fall of 5% every 5 years for women aged 20–24, of 15% for those aged 25–39, and of 25% for those aged 40–49.

Estimate (*c*) assumes that fertility rises to the 1931 level, while mortality continues to fall.

Table II

INCREASES IN ADULT POPULATION AND NUMBERS OF NEW HOUSES REQUIRED IN PERIOD 1939–45: ESTIMATE PREPARED BY DR. ENID CHARLES

Year	Total population (thousands)	Children under 20 (thousands)	Adults (thousands)	Increase in adults	Number of new houses (approx.)
1939	40 794	12 136	28 658	—	—
1940	40 828	11 995	28 833	175 000	70 000
1941	40 855	11 737	29 118	460 000	115 000
1942	40 875	11 495	29 380	722 000	105 000
1943	40 885	11 311	29 574	913 000	80 000
1944	40 885	11 170	29 715	1 057 000	55 000
1945	40 876	11 026	29 850	1 192 000	55 000

Table III

ESTIMATED COMPOSITION OF 100 FAMILIES IN 1950: FIGURES GIVEN BY THE ASSOCIATION FOR PLANNING AND REGIONAL RECONSTRUCTION

	Number of persons in families with young children	Number of persons in families without young children	Total
Children under 14	18·2	—	18·2
"Children" 14–17	2·0	—	2·0
"Children" 18–21	—	7·3	7·3
"Children" over 21	—	6·2	6·2
Parents	17·3	31·7	49·0
	37·5	45·2	82·7
Adults living singly, 21–65 ..			12·3
Adults living singly, over 65 ..			5·0
			100·0

Table IV

ESTIMATES OF POPULATION FROM 1937 TO 1971 PUT FORWARD BY THE REGISTRAR-GENERAL

	Actual population		Forecast population		
	1937	1941	1951	1961	1971
Total population ..	(thousands) 46 008	(thousands) 46 565	(thousands) 47 501	(thousands) 47 192	(thousands) 45 980
Deviations*	—	± 25	± 280	± 805	± 1 579
Age and sex groups:					
0–15: persons ..	10 197	9 573	9 054	8 433	7 600
15–30: male ..	5 614	5 541	4 975	4 443	4 274
female ..	5 691	5 539	4 907	4 319	4 147
30–45: male ..	4 913	5 260	5 436	5 099	4 413
female ..	5 438	5 637	5 557	5 069	4 351
45–65: male ..	4 751	4 867	5 579	6 382	6 542
female ..	5 552	5 822	6 482	6 957	6 790
Over 65 persons ..	3 870	4 326	5 511	6 490	7 863
	Distribution per 1 000 total population				
Age and sex groups:					
0–15: persons ..	221	205	191	179	165
15–30: male ..	122	119	105	94	93
female ..	124	119	103	92	90
30–45: male ..	107	113	114	108	96
female ..	118	121	117	107	95
45–65: male ..	103	105	117	135	142
female ..	121	125	137	147	148
Over 65: persons..	84	93	116	138	171

* These figures indicate the variations which would be produced under more favourable and less favourable assumptions, the modifications for this purpose being as follows:—

More favourable assumptions: the ultimate mortality and fertility reached in 1971 to be 10% lower and 10% higher than the standard respectively, with rateable differences for intervening years.

Less favourable assumptions: the same procedure but with factors 10% higher and 10% lower respectively in 1971.

The positive and negative deviations on the bases adopted are so nearly equal that they are shown as a single figure preceded by a plus and minus sign.

APPENDIX V

THE FUTURE OF THE DOMESTIC WORKER

After the last war there was undoubtedly a shortage of domestic workers. By 1921, however, the domestic workers in England and Wales numbered 1 148 698. This figure has remained fairly constant, for in 1931 the number of women and girls employed as indoor private domestic servants in Great Britain was 1 471 000. Once demobilisation is complete it is unlikely that there will be any falling-off in actual numbers of domestic workers, but their distribution may be considerably different. If this country is to regain its prosperity it will be essential that all available labour be used to the best advantage. This means that there will almost certainly be a revolt against old-fashioned methods of housework. The trend will be towards the use of more labour-saving devices, and every possible means of making housework simple and clean must be introduced. Progress in this direction will be assisted by the introduction of improved conditions for domestic workers, a matter which is now being pressed forward by the National Union of Domestic Workers, the Household Service League of the National Council of Women of Great Britain, and many other national organisations and private bodies and individuals.

It is reasonable to hope that the domestic worker of the future will be equipped with a certificate, issued after satisfactory completion of a recognised training course, and will be entitled to good conditions of employment, and a status equal to that of any other class of worker. The housewife who can afford to employ a domestic assistant will no longer be able to expect more than 48 hours' work a week from her, but this should be quite sufficient to enable a fully trained worker who has at her disposal household equipment designed for efficient running of the house to get through her work in a few hours each day.

APPENDIX VI

EXISTING DISTRICT SCHEMES FOR SPACE HEATING AND WATER HEATING

District heating is constantly advocated by planners as one of the best means of providing space heating and hot water for new housing estates. An account of the development of this system during the last 20 years was given by Dr. D. V. H. Smith in 1941 to the Institution of Engineers and Shipbuilders in Scotland. He described seventeen European district heating stations as well as two which have been functioning in Great Britain for almost the whole period covered by his paper.

The British stations are of special interest and are covered by a report issued by the Dundee Town Council in 1924. Two housing estates, one of 250 and the other of 268 houses, are heated to a temperature which is regulated by the tenants, and supplied with hot water at 160° F. In one case the system consists of calorifiers, thermostats and circulating pipes, the calorifiers being supplied with steam from boilers attached to the public washhouse. In the other case hot water is supplied by direct circulation from the boiler-house of the public washhouse.

The tenants on the two estates are said to be well satisfied with the services, which are supplied at a cost of 3s. 9d. and 3s. per week, according to the size of house. This involves the Council in an annual loss of £750 on the smaller estate and a slight loss (figure not quoted) on the larger. The figures quoted for running costs are £3 000 and £2 500 a year respectively, and the original charges to the tenants were 2s. 6d. and 2s. a week. As the losses which these charges involved were considered to be too heavy an attempt was made to charge 5s. and 4s., but this was more

than the tenants could pay. At the time of issue of the Dundee report it was hoped to cover the small losses on the 3s. 9d. and 3s. rates by reductions in fuel used and wages paid.

A less comprehensive scheme has been operating for some years in a Midland town. Hot water is supplied by underground pipes from a motor-car factory for radiators in the parlour and in one bedroom, as well as to taps in the kitchen and bathroom. The charge to the tenants is 2s. a week, but in this case the tenants are faced also with a fuel bill for the combination grate in the living room.

APPENDIX VII

SOME TRENDS IN THE APPLICATION OF PRE-FABRICATION TO HOUSE-BUILDING

It is claimed by many experts that the use of pre-fabricated component parts in building houses will not only make it possible to cut down the time taken in erecting houses but will also reduce costs by turning the house into as "mass-produced" an article as the motor-car. The Committee has had an opportunity of inspecting a house constructed by these methods, and was impressed with the possibilities it seemed to offer of providing labour-saving houses of good appearance both quickly and cheaply. The following extract from the relevant report of the Committee gives some idea of a type of house which can be made in a factory and assembled on the site so as to be ready for habitation within 24 hours of the arrival of the component parts.

The house is built on a skeleton of steel tubes, which support the outside walls. The walls are made of tiles, which are covered with plaster and can be finished in a variety of ways. The inner walls are built of Hitchin blocks—wooden frames, filled with a mixture of wood shavings and cement—and the surfaces presented to the rooms are covered with wood veneer (for the living rooms) or strong washable rexine (for the kitchen).

The heating and plumbing arrangements are of special interest. All pipework, including the soil pipe and the metal flue pipe, is enclosed in a special central duct, passing through the house from top to bottom. A detachable panel above the kitchen sink opens on to a lighted compartment in which all joints and taps are easily accessible for any necessary repairs. The house is heated by one open-fire stove. This is placed in a corner of the living room and supplies heat to two radiators as well as dealing with the domestic hot water supply, for which a 30-gallon tank is installed. Supplementary heating for the bedrooms is to be provided by gas fires.

The kitchen is entered by the door leading from the road, to which the back of the house faces. It is divided into two parts, separated by the wall which encloses the piping duct and extends three-quarters of the way across the kitchen. The part of the kitchen nearest to the front door is arranged as a "utility" room and has a very large sink, a wash boiler and a draining board running along one side. A large drying cupboard extends over the end wall, and the wall opposite the sink is fitted with excellent cupboards, complete with good shelves and hanging equipment for storing brooms and cleaning equipment. This utility room makes it possible for laundry work to be carried out away from the part of the kitchen in which food is prepared, and also for dirty and wet garments to be removed before entry to the house. The space between the end of the dividing wall and the window can be closed off with a folding door when washing is being done, so that no steam penetrates to the cooking part of the kitchen. The cooker, sinks and draining boards are placed along the wall enclosing the pipe duct, and the opposite wall is fitted with excellent floor-to-ceiling cupboards. A long work table runs between these cupboards, with store cupboards above and below. The kitchen leads into a

dining recess, sufficiently large to accommodate a table and six chairs, and this in its turn leads to the living room. All the rooms on the ground floor have folding doors, so that kitchen, dining recess and living room can either be thrown into one or divided into two or three parts at the convenience of the housewife. (Some members of the Committee were very impressed with this arrangement, but others felt that mothers of young families would prefer the more conventional type of parlour house, in which one room can be kept away from the children in order to preserve the furniture.)

The ground floor is completed by a small hall from which the staircase leads to the bedrooms and bathroom. There is a storage place for a pram under the stairs.

The upper storey contains three bedrooms, one of which is only large enough for one single bed, and the bathroom, which is fitted with bath, hand basin and W.C., as well as both hot and cold water tanks, which are insulated and are placed in the airing cupboard.

It is intended to build these houses in semi-detached units with a covered area at either end for each house. This covered extension will contain the garage, to which access is obtained from the road; a W.C; a fuel store; and a covered play-space facing the garden, for use by the children in wet weather. The kitchen door opens directly into this covered area, an arrangement which has the great advantage that one can reach the fuel store without the need for going out of doors. Fuel is emptied into the store through a door in the outer wall, so that the coalman does not need to enter the house. All meters are placed just inside the kitchen door.

APPENDIX VIII

EFFECT OF COST OF APPLIANCES ON COSTS OF HOUSING

TABLE SHOWING THE AMOUNTS OF RENT (SPREAD OVER THE LIFE OF THE APPLIANCE) REQUIRED TO COVER THE INITIAL COST OF DOMESTIC APPLIANCES

Initial cost of domestic appliance	8-year life		12-year life		16-year life		20-year life	
	Per year	Per week	Per year	Per week	Per year	Per week	Per year	Per week
£	£ s. d.	pence	£ s. d.	pence	£ s. d.	pence	£ s. d.	pence
5	12 6	2·88	8 4	1·92	6 3	1·44	5 0	1·15
10	1 5 0	5·76	16 8	3·84	12 6	2·88	10 0	2·30
15	1 17 6	8·64	1 5 0	5·76	18 9	4·32	15 0	3·45
20	2 10 0	11·53	1 13 4	7·68	1 5 0	5·76	1 0 0	4·61
25	3 2 6	14·42	2 1 8	9·61	1 11 3	7·20	1 5 0	5·76

APPENDIX IX

TYPICAL HOUSEHOLD BUDGETS OF INSURED WORKERS

These figures are taken from the Report of the Ministry of Labour and National Service on the Weekly Expenditure of Working-Class Households in the United Kingdom, 1937–38. Figures of expenditure are, of course, very different under war-time conditions.

Table I

NUMBER OF PERSONS IN EACH HOUSEHOLD

	Industrial households	Agricultural households	Rural-area households
1. Number of households covered by survey	8 905	1 491	366
2. Average number of persons per household:			
Children under 14 years	0·99	1·14	1·64
14–18 years	0·31	0·26	0·38
18 years and over	2·47	2·39	2·23
Total (all persons)	3·77	3·79	4·25

Table II

SUMMARY OF AVERAGE EXPENDITURE PER HOUSEHOLD

	Industrial households	Agricultural households	Rural-area households
	s. d.	s. d.	s. d.
Rent or purchase of dwelling	10 10	4 9	4 7
Food	34 1	27 9	28 1
Clothing	9 4	5 10	5 3
Fuel and light	6 5	4 11	4 9
Other items	25 7	14 8	14 0
Total	86 3	57 11	56 8

Table III

DETAILS OF EXPENDITURE ON FUEL AND LIGHT

	Industrial households	Agricultural households	Rural-area households
	s. d.	s. d.	s. d.
Coal	3 2	2 11	2 11¼
Coke	1	½	½
Gas (including payment for meter rent)	1 5½	4	2½
Electricity (including payment for meter rent)	11¾	3¼	4¼
Oil, firewood, candles and matches ..	8¾	1 4¼	1 2½
Total	6 5	4 11	4 9

APPENDIX X

EFFECTS OF SAVINGS OF FUEL AND LABOUR ON HOUSEHOLD BUDGETS

Table I

YEARLY AND WEEKLY SAVINGS MADE POSSIBLE BY CUTTING DOWN ANNUAL COAL CONSUMPTION BY 2 TO 5 TONS, ASSUMING COAL COSTS 30S. TO 60S. A TON*

Tons saved; and price per ton	Annual cash saving	Weekly cash saving	Tons saved; and price per ton	Annual cash saving	Weekly cash saving
	£ s.	shillings		£ s.	shillings
2 at 30s.	3 0	1·15	4 at 30s.	6 0	2·30
2 35s.	3 10	1·34	4 35s.	7 0	2·69
2 40s.	4 0	1·53	4 40s.	8 0	3·07
2 45s.	4 10	1·73	4 45s.	9 0	3·46
2 50s.	5 0	1·92	4 50s.	10 0	3·84
2 55s.	5 10	2·11	4 55s.	11 0	4·23
2 60s.	6 0	2·30	4 60s.	12 0	4·61
3 at 30s.	4 10	1·73	5 at 30s.	7 10	2·88
3 35s.	5 5	2·01	5 35s.	8 15	3·36
3 40s.	6 0	2·30	5 40s.	10 0	3·84
3 45s.	6 15	2·59	5 45s.	11 5	4·32
3 50s.	7 10	2·88	5 50s.	12 10	4·80
3 55s.	8 5	3·17	5 55s.	13 15	5·29
3 60s.	9 0	3·46	5 60s.	15 0	5·77

* Working-class expenditure on coal in 1937–38 was approximately 3s. 1d. per week, i.e. 4·50% of an income of £3 10s. per week.

Table II

TIME SAVED BY REDUCING LABOUR BY 10 TO 20 MINUTES A DAY, SHOWN IN HOURS PER WEEK AND PER YEAR, AND GIVEN A MONETARY VALUE BASED ON PROVINCIAL AND LONDON RATES OF PAY FOR CHARWOMEN (10D. AND 1S. 3D. PER HOUR RESPECTIVELY)

Time saved			Money saved (provincial rate)		Money saved (London rate)	
Day	Week	Year	Week	Year	Week	Year
min.	hr. min.	hr.	pence	£ s. d.	pence	£ s. d.
10	1 10	61	11·70	2 10 10	17·59	3 16 3
11	1 17	67	12·88	2 15 10	19·32	4 3 9
12	1 24	73	14·03	3 0 10	21·05	4 11 3
13	1 31	79	15·19	3 5 10	22·78	4 18 9
14	1 38	85	16·34	3 10 10	24·51	5 6 3
15	1 45	91	17·50	3 15 10	26·24	5 13 9
16	1 52	97	18·65	4 0 10	27·98	6 1 3
17	1 59	103	19·80	4 5 10	29·71	6 8 9
18	2 06	109	20·96	4 10 10	31·44	6 16 3
19	2 13	115	22·11	4 15 10	33·17	7 3 9
20	2 20	121	23·27	5 0 0	34·90	7 11 3

APPENDIX XI

APPLIANCES SUGGESTED FOR INCLUSION IN POST-WAR HOUSES WHERE SOLID FUEL IS USED

I. ROOM HEATING

A. Living rooms

(1) Open fires designed to heat by both radiation and convection.
(2) Free-standing heating stoves of closed- and open-fire types.

Where solid fuel is used for room heating it is preferable to select appliances giving as many as possible of the following advantages:—

(*a*) All-night burning.
(*b*) Infrequent ash removal.
(*c*) Smoke reduction.
(*d*) Ability to burn all types of solid fuel.

B. Bedrooms and sitting rooms used only occasionally

(1) Good open fires of usual stool-bottom or hearth-bottom types.
(2) Heating by convected air drawn from living-room fire, and supplemented, if desired, by portable gas and electric heaters.

II. Room and Water Heating

(1) Open fires with back boilers.
Where constant hot water is required the types of fire which are designed for all-night burning give the most satisfactory results.
(2) Free-standing stoves, with boiler incorporated, and preferably of the open-fire type.
It is possible to supply heat to radiators and towel rails from some of these stoves.

III. Space Heating and Water Heating Combined with Cooking

(1) Combination grates with side or top oven, back boiler and permanently open fire.
(2) Back-to-back grates, with open fire in living room; boiling-plate and oven in kitchen.
(3) Combination grates with fires that can be closed, and designed for all-night burning, so as to give constant hot water supply and rapid heating of oven and boiling-plate.
(4) Back-to-back grates giving the advantages mentioned under (3). In both cases the fire doors should be insulated to prevent overheating of the living room while cooking is in progress.

IV. Cooking

Free-standing ranges, heavily insulated to prevent overheating of the kitchen and to ensure low fuel consumption.

It is important that solid-fuel cookers should be chosen from types which have the following additional advantages:—

(*a*) Good finishes, preferably of vitreous enamel, to give easy cleaning.
(*b*) Accessible flues, which can be cleaned without dirtying the surroundings and the housewife's hands.

V. Cooking and Water Heating

Free-standing ranges, with boiler, preferably of the continuously burning type, to secure constant hot water.

VI. Water Heating

Independent boilers, of good appearance. These can be obtained with fires that may be opened to warm the kitchen; but if this facility is provided the hot water output and efficiency are necessarily lower.

Radiators and heated towel rails can be operated in connection with most types.

APPENDIX XII

IMPORTANCE OF THE USE OF RAW COAL IN SUPPLYING DOMESTIC HEAT

One-third of the total coal output of this country is used for domestic purposes. It provides household services which may be classed as:—

Climate compensation (heat, light and ventilation);
Nutrition (cooking and refrigeration);
Hygiene (hot water, drying and airing of clothes);
Amenities (ironing, vacuum cleaning, radio, etc.).

This coal is either burned directly—in the raw state or after conversion into smokeless solid fuels—or is used for the production of gas and electricity. The amounts used annually in each of these ways are as follows (in millions of tons):—

Solid fuels	
Raw coals and anthracite ..	45
Coke	6
Gas and Electricity	12
	63

The immense preponderance of solid fuel is a matter which calls for careful consideration. The burning of raw coal in a room is the method of solid-fuel utilisation which gives the largest proportion of heat per ton of coal used. The amount of heat produced from the coal burned in any heating appliance depends on the efficiency of the appliance itself and its method of use. In the case of a coal fire the amount of heat released into the room depends only on the efficiency of the fire itself, but it must be remembered that when gas fires are used the carbonisation process divides the heat content (in therms) of the coal between gas and its by-products, coke, benzole and tar, and there is a loss of heat in the process of carbonisation amounting to some 25%. Nor does the electric fire give the full heat content of the coal used to make the electricity. The generation of electricity is usually carried out with an efficiency of about 20%, this figure being reduced to some 18% when allowance is made for losses due to transformation and transmission.

It must be admitted, however, that if convenience and cleanliness in use are taken into account the use of gas and electric heating may be preferred. The by-products of the carbonisation industry tend to offset the heat losses involved in the process of gas manufacture.

There is, nevertheless, one undoubted advantage in the use of solid fuel in a climate such as ours, namely that it can be stored against sudden cold spells. If we were dependent upon gas and electricity, a huge reserve of plant would be required to meet the peak heating demand, and unless a special summer demand for gas and electricity were created much of the plant would be idle for the greater part of the year. At present a balance between summer and winter gas and electricity consumption is maintained, as existing plant is overhauled during the period of lowest production; but any great change in demand would create a serious disturbance of the economics of these industries.

The question of cost is also important. The price of coal for making gas and electricity is already rising, and is likely to continue to do so if miners are to be provided with adequate remuneration. If the house coal market, from which the bulk of the cost of coal production is at present obtained, were appreciably decreased, it would be necessary to increase the prices of coal for making gas and electricity to a point at which the cost of these fuels to the consumer might well become prohibitive.

It is therefore necessary, for both practical and economic reasons, to look to raw coal to supply a high proportion of domestic heating services for many years to come. The realisation of this has given an incentive to the coal industry and the coal-burning appliance makers to press forward with research which will make the use of coal in the home as clean and labour-saving as possible. Thus, one of the aims has been to reduce labour to a minimum by producing continuously burning appliances, which will do away with the bugbear of daily lighting and ash-removal and at the same time give a satisfactory supply of heat.

It is admitted that atmospheric pollution by smoke is a disgrace and should be prevented.

The only practical ways to smoke abatement are either to use smokeless fuels or to develop methods of burning bituminous coal so as to produce little smoke, and at the same time to retain all the advantages of the coal fire.

We recognise that the improvement of domestic heating services has, so far as the use of solid fuels is concerned, only been intensively studied in recent years; and that there is therefore much to be learned from the progress of research work which is being carried out at the present time. The recommendations made in the body of this Report, however, are consistent with trends which are now emerging, and although it is impossible to put forward any final plans, the Women's Advisory Committee on Solid Fuels intends to suggest from time to time methods whereby improvements in efficiency and cost of domestic heating services may be utilised to the best advantage by the women of the country.

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← Since this Appendix was written, miners' wages have been further increased and stabilised for four years.

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